FOUR NEW CALIFORNIA MOTHS WITH NOTES ON EARLY STAGES

By John A. Comstock

Early in 1937 Mr. Darwin Tiemann brought to our laboratory a number of larvae which he had taken May 16 of that year in the Cuyama Valley, San Luis Obispo County, California, feeding on *Hymenochloa salsola* T. & G. These were raised to maturity, and submitted to Dr. McDunnough who generously suggested that, in view of our observations on the early stages, we should publish the species. Accordingly we describe it as follows:

Somatolophia cuyama sp. nov.

Holotype ♂. Alar expanse, 30 mm. Plate 38.

Antennae bipectinate from base to tip. Head, thorax and abdomen, dark buff.

Wings, ground color, light straw, overlaid with a sprinkling of light brown scales. From the outer margin to the subterminal

PLATE 38

Somatolphia cuyama Comst. Holotype ♂, enlarged x $2\frac{1}{2}$.

Photo by Cobb.

area both wings are a uniform light straw, sprinkled with light brown. Internal to this is a band of dark brown, dentate on its outer margin and gradually becoming lighter medially. There is a well defined crenulate tp. line of dark brown on the forewing, which is obsolescent or only slightly indicated on the secondary, and a poorly defined ta. line on primary only. Well defined discal spots occur on both wings.

The secondaries are somewhat more lightly maculated than the primaries, as will be noted by reference to the illustration.

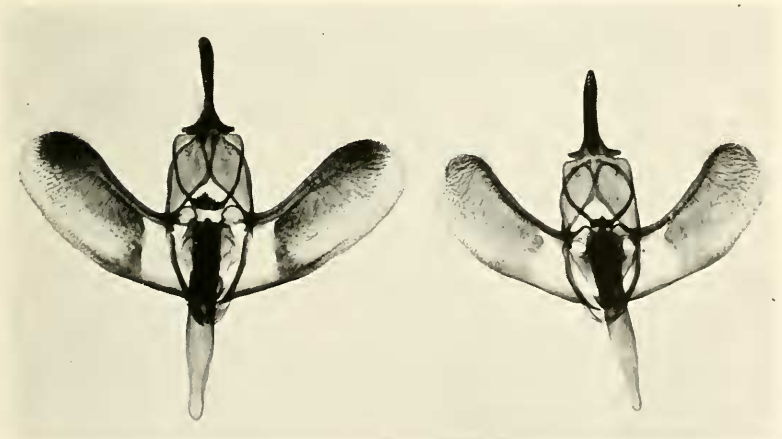
The under surfaces of both wings are very similar to the upper, but with considerably less of the dark brown scaling, hence paler.

The species bears considerable resemblance to *Somatolophia* (Meris) *simplicius* B & McD., (see Cont. Lepid. IV 2, 155, Pl. 20, figs. 4 and 5, 1918), but lacks the black scaling in that species, and has more pronounced ta. and tp. lines. It should be placed next to *S. ectrapelaria* Groosb. in the lists.

Genitalia of *S. simplicius* and *S. cuyama* are shown in Plate 39. The broader and more rounded harpe of the former in comparison with that of *cuyama* will be noted as will also the difference in the uncus.

Type series.

Holotype ♂ and 9 paratypes, all males, emerged June 3 to 10, 1937. Raised from larvae collected in the Cuyama Valley,



A B

PLATE 39

Genitalia of (A) *Somatolophia simplicius* and (B) *S. cuyama*.

Prep. by McDunnough. Photo by Cobb.

San Luis Obispo County, California. We have in addition five females, but as all of these failed to expand their wings, they are not included in the type series.

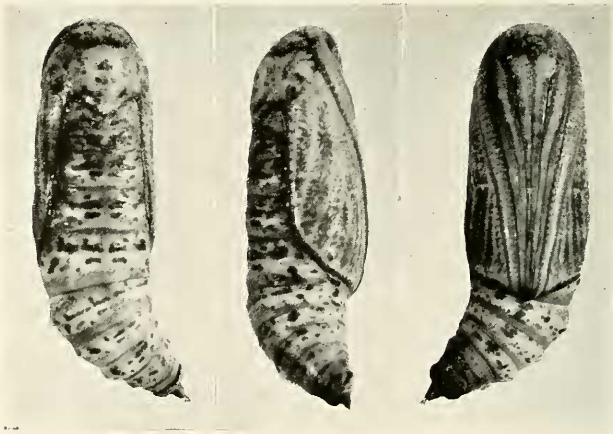
Paratypes will be placed in the Canadian National Museum, Ottawa, and the U. S. National Museum. The remaining paratypes and holotype in the Los Angeles Museum.

Mature larva: length about 33 mm.; cylindrical, of the usual geometrid type. Body ground color, soiled yellow and white.

In the mid-dorsal area there is a wide mottled band of soiled yellow running longitudinally. Lateral to this occurs a wide white area, interrupted at the segmental junctures by an extension of the soiled yellow. In the center of the white area, and placed suprastigmatally there is a longitudinally placed row of black subquadrate spots (one or two to a segment). Spiracles, black or dark gray. A number of small black spots are grouped irregularly around each spiracle, and posterior thereto is a prominent orange spot with a minute black point in its center bearing a single seta. About 2 mm. above each of these orange spots is another of the same color. A number of colorless setae, arising from black points, are scattered over the body.

Legs: the proximal segments are soiled yellow, sparingly blotched with black. Terminal segments, black. Prolegs, soiled yellow, sparingly spotted with black or dull olive.

On the three dorsal segments of the larva there is a dorsolateral broken band of orange which continues forward onto the cheeks, the remainder of the head being soiled yellow, heavily



a b c

PLATE 40

Pupa of *Somatolophia cuyama* Comst., enlarged approximately x 3½.

(a), Dorsal aspect. (b), Lateral aspect. (c), Ventral aspeect.

sprinkled with large black dots. Mouth parts edged with black. The head bears a number of colorless setae.

Pupa: length about 15 mm. Brown, heavily blotched with darker brown spots, disposed as shown on plate 40. The wing cases extend about three-fifths the distance towards cauda, and the antennae reach to their margin. Terminal segment of abdomen, roughened, and somewhat flattened posteriorly. It is topped by a pyramidal roughened button which bears two long recurved black hooks, and six short hooklets.

A few short brown setae are scattered over the front of the head.

Our illustration shows the shape, and such other details of maculation as are not specifically mentioned above.

Lithariopteryx jubarella sp. nov.

Holotype ♂, expanse 11.5 mm. Plate 41, fig. A.

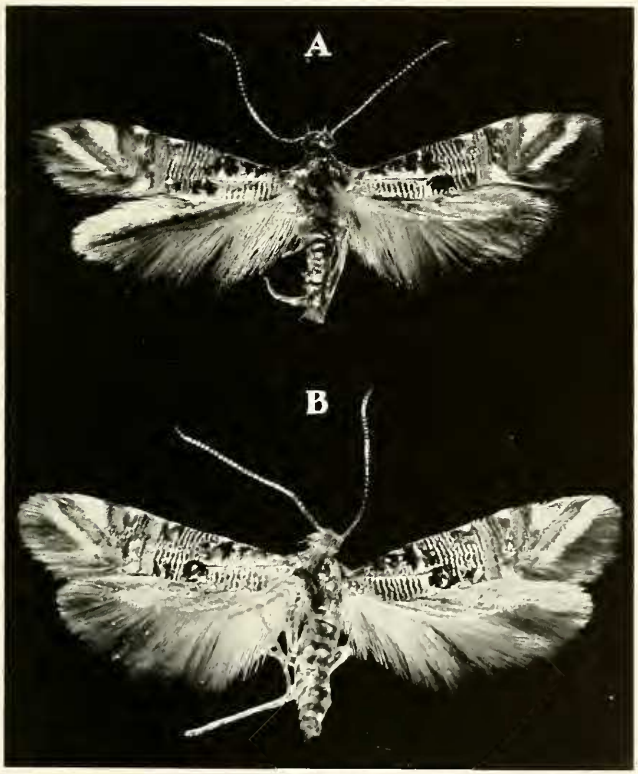


PLATE 41
Lithariopteryx jubarella Comst.
(A), Holotype ♂, superior surface.
(B), Allotype ♀, superior surface.
Enlarged x 7. Photo by Cobb.

Antennae annulate silver and brown. Head and thorax, lustrous gold. Abdomen above, annulate silver and brown.

Forewing: superior surface; ground pattern a series of fine brownish black wavy lines on a white ground, running transversely across the wing. Basally close to the costa there are two metallic raised discs, appearing in some lights to be gold, in others, silver-gold. Around the bases of these are a few black scales interspersed with a sprinkling of rich gold scales. On the outer half of wing, close to costa occurs another pair of raised metallic discs similar to the first described pair. Between these there is a broad band of golden orange running transversely across the wing from costa to hind margin. On its outer edge, and close to the inner margin of the wing is a fourth metallic disc. A fifth and sixth disc of the same character are present medial to the fourth.

The two outermost metallic discs are bounded laterally by a golden orange band, which does not quite extend to the inner wing margin, and which is joined by a similar band running diagonally inward from the apex. The triangle formed by these two orange bands is filled with lustrous white scales. Lateral to the outermost orange band is a prominent white marginal band paralleling it.

Fringes, gray; very long.

Secondaries: narrow, triangular, the surface covered with round gray scales. Fringes very long, gray near outer angle, merging to straw near the base.

The under surfaces of both wings are predominantly gray, with a few scattered white scales.

Allotype ♀, expanse 12 mm. Plate 41, fig. B.

Color and maculation exactly as in the holotype, the only difference being the slightly greater wing expanse and heavier abdomen.

Type series.

Holotype and allotype, Mason Valley, San Diego County, California, April 23, 1939, collected by Lloyd Martin. Paratypes Nos. 1 to 55, same locality, date and collector. Paratypes Nos. 56 to 60, near Llano, Mojave Desert, California, April 10, 1939, collector J. A. Comstock. Paratype No. 61, New York Mts., San Bernardino County, California, May 20, 1939, collector J. A. Comstock. Holotype, allotype and a series of paratypes in the Los Angeles Museum. Paratypes will be placed in the National Museum, Washington, D. C.; the Canadian National Museum at Ottawa; the Academy of Natural Sciences, Philadelphia; the California Academy of Sciences, San Francisco, and the Natural History Museum, San Diego, California. Later on, when ship-

ping conditions become more normal, paratypes will be sent to the British Museum.

The author took a long series of this species flying over and resting on *Mirabilis*, at the Lovejoy Buttes near Llano, Mojave Desert, California, in April, 1939. On the same plants were numerous larvae which we supposed were of the same species. Numbers of these were raised to maturity, and much to our surprise proved to be a Lithariopteryx of quite a different color. No intergrades between the two were encountered. We describe the second species as follows:

Lithariopteryx mirabilinella sp. nov.

Same size, shape and general pattern as *L. jubarella*, but a much darker and grayer insect. The scales over head and thorax are a lustrous blue silver, as are also those on the raised discs of the forewing. There are no gold scales on this species as in *jubarella*. The orange bars on apical portion of forewing which are so characteristic of *jubarella* are suppressed in *mirabilinella* except for a faint suggestion of yellow in the centers of the outer two. The transverse bars of white covering the main ground of the wing are, in *jubarella*, formed of squares running in series, whereas in this species they are formed of elongate lunules, which causes the lines to appear much more crenulated, and wider.

The white triangle and marginal white bar in the apical portion of primary in *jubarella* is here replaced by a spotted black and white area.

The secondaries in this species are nearly black, and the fringes very dark, particularly at the outer angle.

PLATE 42

Lithariopteryx mirabilinella Comst.

Allotype ♀, superior surface, enlarged approximately x 6½.

Photo by Cobb.

On the under side both wings are almost a solid black, with two white short dashes in the costa of primary, near the apex, and a few scattered small white scales along the costal margin. The fringes are contrastingly white at the base and black at the outer margins.

Holotype ♂, allotype ♀, and 25 paratypes, all raised from larvae collected on *Mirabilis (laevis?)*, at Lovejoy Buttes, near Llano, Mojave Desert, California, all of which emerged on various dates in May, 1939. The same distribution will be made of paratypes as is listed for *jubarella*.

There is, of course, a possibility that *L. mirabilinella* is a dimorphic second brood of *jubarella*, but the two are so very different in many particulars as to warrant our considering them distinct species until such time as further breeding of both will determine their relationship.

The mature larva of *Lithariopteryx mirabilinella* measures about 7 mm. in length. Body ground color, green, shading to darker green toward the caudal end. It is widest through the center, tapering towards head and cauda. The legs, four pair of prolegs and anal prolegs are green.

Head, relatively small; yellow. Ocelli prominent; jet black.

The larva mines a single leaf, starting usually from the base. It also spins a protective webbing over the top of the leaf.

Pupation occurred on the floor of the breeding jar, in a delicate lightly woven cocoon, through which the pupa was dimly visible.

A minute parasite, the species as yet undetermined, killed a considerable percentage of the pupae.

Pupa, length 5 mm. Color, olive green, with an edging of russet brown.

A B C

PLATE 43

Pupa of *Lithariopteryx mirabinella* Comst. enlarged approximately x 7. (a), Dorsal aspect. (b), Lateral aspect. (c) Ventral aspect.

Photo by Cobb.

Shape, navicular, markedly flattened through the posterior half.

Head well rounded; russet brown.

Two prominent ridges occur longitudinally along the dorsum of the abdomen, their outer edges crowned with short spiculiferous processes, two to each segment on each ridge. Along the outer edge of abdomen occurs a similar row of processes.

The wing cases and maxillae extend posteriorly nearly to the cremaster; the latter not prominent, and bearing only a few vibrissae without recurved tips. Antennae terminating two-thirds the distance towards cauda. The wing cases bear a series of fine parallel transverse sculptured striations. The pupa is figured on Plate 43.

I am greatly indebted to that Nestor of microlepidopterists, August Busck, for assistance and helpful suggestions in the study of the last two described species.

PLATE 44

Gall of *carolella beevorana* Comst., on stem of *Franseria dumosa*. Slightly enlarged.

Photo by Cobb.

Late in January, 1938, Mr. Guy Beevor, of the State Plant Quarantine station at Yermo presented us with a number of interesting moths taken at light near Yermo, two of which were Phaloniids which we suspected were new to science. Our recent study of two other species in the genus *Carolella*, (the results of which were published in Bull. So. Calif. Acad. of Sci., Vol. 38, Part 2, pp. 112-118, 1939) have confirmed this suspicion.

Knowing that the species must be a gall former in some desert Composite we decided to search for the larvae in the Yermo area at the first opportunity. Accordingly, on October 30 and 31, 1939, we made a thorough investigation of the native shrubs growing along the highway from Yermo to Essex on the Mojave Desert. At a point near Ludlow, San Bernardino County, a heavy growth of *Franseria dumosa* Gray borders the highway for several miles, and about one out of every fifty bushes that we examined bore stem galls. These were somewhat similar in size and shape to the galls of *Carolella busckana*, but the very different character of the wood and bark of *Franseria* gave them a totally different surface texture.

A considerable number of these galls were collected and placed under observation in our laboratory. The first moth emerged Dec. 4, 1939, and proved to be the species for which we had been searching. Twenty-two examples have hatched to date.

We take pleasure in naming the species for Mr. Beevor, in recognition of his many courtesies throughout the past several years.

Carolella beevorana sp. nov.

Holotype ♂, alar expanse 30 mm.

Head, thorax and abdomen, uniformly sprinkled gray.

Upper surface of primaries: costa, nearly white in its outer two-thirds, becoming darker near base; crossed by four spots or short bars in the subterminal area.

PLATE 45

Carolella beevorana Comst.

Allotype ♀ superior surface, enlarged approximately x 2.

Photo by Cobb.

Ground surface of wing sprinkled with an admixture of gray and white scales. Diagonally across the center of wing, a dark bar, beginning near the outer end of cell where it is widest and lightest, extending medio-posteriorly to terminate in a point near the posterior margin, the lower part of the bar being darker, narrower, and more distinct. This bar has a displacement or "jog" at the beginning of its lower third, in some examples being nearly separated from the upper portion at this point. The entire bar is narrowly margined with white.

A large subreniform dark spot nearly fills the submarginal area of the wing. This also is narrowly margined with white.

The fringes are predominantly white but are narrowly streaked with gray at the ends of the nervules.

Secondary: superior surface; uniform lustrous light gray; fringes, lustrous white.

Under surface: primary; uniform dark gray except for the margins which are liberally sprinkled with white. The four short dark bars on the costa carry through from the superior surface.

Under surface: secondary; same as on the superior surface.

Allotype ♀, expanse 32 mm. Plate 45.

Practically the same as the male in all of its markings, and distinguished only by its larger size and heavier abdomen.

This species differs from *Carolella busckana* in several important particulars. It is much larger on the average, and considerably lighter. The diagonal bar across the primaries is disjointed, and the secondaries have no suggestion of the net-like reticulation that is characteristic of *busckana*. The fringes on the primaries of *busckana* have as many dark scales as they have white, whereas in *beevorana* the white scales far outnumber the dark.

I consider *beevorana* much more closely related to *willettana*, (in spite of their marked difference in appearance) and am now convinced that the last named is a valid species rather than a form of *busckana*.

Type series.

Holotype: near Ludlow, Mojave Desert, California, emerged Dec. 11, 1939, collected by J. A. Comstock.

Allotype, same locality and collector, emerged Dec. 16, 1939.

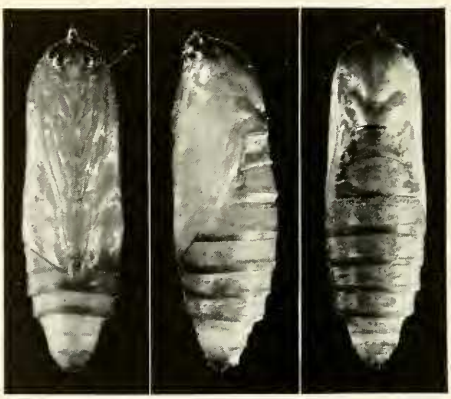
Twenty paratypes, eighteen of which were collected at the above locality, and emerged from Dec. 4 to 31, 1939; two collected by Guy Beevor, Yermo, California, Jan. 28, 1938, at light. Para-

types will be distributed to the National Museum, the Canadian Museum at Ottawa, the California Academy of Sciences, and the Natural History Museum at San Diego. The holotype, allotype, and a series of paratypes in the Los Angeles Museum.

The galls of this species are formed on the medium-sized stems in old bushes of *Franseria dumosa* Gray, (Burro Weed). Mature galls measure about 1½ inches long by slightly more than half an inch wide. See plate 44.) Pupation occurs in mid-winter, the larva spinning a cocoon and exit channel within the gall in about the same manner as was described for *Carolella busckana.*

Along with the mature galls we found an equal number of immatures containing very young larvae, which suggests either a period of two years for full development of the imago, or else a much more protracted season of emergence than seems reasonable to suppose.

The larva is similar to that of *C. busckana* except possibly for its darker coloration. The pupa, which is illustrated on Plate 46 has a stouter and longer keel-like process on the vertex, perhaps as an adaptation to the more woody nature of the plant. It is also considerably darker in color, and more cylindrical in shape. In other respects it resembles the pupa of *C. busckana.*



a b c

PLATE 46

Pupa of *Carolella beevorana* Comst.
(a), Ventral, (b), lateral and (c), dorsal aspects, enlarged x 3½.
Photo by Cobb.